Space Weather Forecast

Issued on Monday, 10 April 2023 at 12:30 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate flares (R1-R2 Minor-Moderate radio blackouts) throughout. Chance of Minor Geomagnetic Storm intervals late day 2 (11th) into day 3 (12th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activty has been moderate with occasional Common-class flares and an isolated Moderate flare at 10/0520 UTC. This occurred from the southeast limb, where a large plage region is just starting to appear. Otherwise, there are currently 5 sunspot regions on the visible disc. The largest and most complex region remains in the southeast, but a notable region has developed in the northeast as well. All other regions are either small or simple.
No Earth directed Coronal Mass Ejections (CMEs) were observed in the period, although a filament in the northwest looks to have partially lifted. We are awaiting further imagery to determine if this produced a CME.

Solar Wind / Geomagnetic Activity: Solar wind measurements over the past 24 hours appear to show a small enhancement from a transient feature followed by a more significant enhancement due to the arrival of a positive coronal hole fast. Speeds were slow through much of the period, but increased from around 10/0730 UTC to around 500 km/s. Total magnetic field strength was weak and steady, but increased to moderate levels from 09/2200 UTC. The north-south component of the magnetic field was weakly negative 09/2300 UTC to 10/0730 UTC. It has been more variable thereafter but of moderate strength. Geomagnetic activity was Quiet (Kp 0-2), but became Unsettled (Kp 3) from midnight, with a period of Active observed 10/0600-0900 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background levels, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary.

Solar Activity: Low to Moderate, with a chance of further isolated Moderate flares. The eastern side of the disc is the most likely source for this, with two notable sunspot regions present and perhaps another one appearing around the southeast limb over the next 24 hours.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs, with a low possibility of a glancing blow either late on 11 or early on 12 Apr. Slightly elevated to elevated solar winds due to a positive coronal hole high speed stream, may become further enhanced later on day 2 (11th) into day 3 (12th) if the CME mentioned above arrives, before winds decline towards ambient levels later on day 3 (12th) into day 4 (13th).
Geomagnetic activity is expected to be mainly Quiet to Unsettled, with occasional Active spells and a chance of G1/Minor Storm intervals, most likely if the potential CME arrives on day 2/3 (11th/12th). On day 4 (13th), activity is likely to become predominantly Quiet.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to remain at background levels, with no solar radiation storms occurring.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	30	30	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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